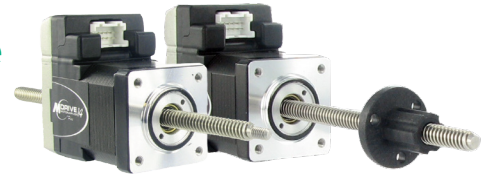


# MDrive<sup>®</sup> Plus MLM•14

CE  REACH IP20

NEMA 14 (35mm) Step & Direction  
Linear Actuator with integrated 1.8° 2-phase  
stepper motor & control electronics



## PRODUCT OVERVIEW

MDrive Linear Actuators are compact linear motion systems. External or non-captive shaft linear mechanicals are integrated with stepper motor and electronics for reliable, repeatable motion. Customization is available for volume opportunities.

Step & direction input products integrate 1.8° 2-phase stepper motor linear actuator, drive electronics and optional encoder.

Step & direction signals of a master controller, e.g. a motion controller, or A/B signals of an encoder are converted directly into motion. Settings may be changed on-the-fly or downloaded and stored in nonvolatile memory using provided software.

MDrive product's precision rolled lead screws are manufactured from premium grade stainless steel with optional Teflon<sup>®</sup> coating. Designed specifically for motion control applications, our high quality screws deliver long life and quiet operation.

Simplify machine design and reduce assembly time by replacing multiple components with a single compact integrated motor. Fewer individual system components eliminates multiple potential failure points, and lowers risk of electrical noise by eliminating cabling between motor and drive.

## FEATURES AND BENEFITS

- Cost effective & compact integrated microstepping drive and NEMA 14 1.8° 2-phase stepper motor
- Non-captive and external shaft style available
- Advanced current control with automatic current reduction for exceptional performance and smoothness
- Single supply: +12 to +48 VDC
- 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes
- Optically isolated Universal inputs accept +5 to +24 VDC signals, sourcing or sinking
- Optically isolated Differential inputs accept +5 VDC signals
- IP20 protection rating
- Configurable options include:
  - Motor run/hold current
  - Motor direction via direction input
  - Microstep resolution
  - Clock type (step & direction, quadrature, step up/down, clockwise & counterclockwise)
  - Programmable digital filtering
- Available options include:
  - Encoder
  - Multiple motor stack lengths
  - Long life linear actuators
  - Rear control knob for manual positioning
- Single motor stack length
- Lead screw lengths from 3.0" to 18.0" (77.5 to 455.0 mm) available in 0.1" (2.5mm) increments
- Lead screws with optional threaded or smooth ends and Teflon coating available
- Setup parameters may be switched on-the-fly
- Graphical user interface provided for quick and easy parameter setup



Additional setup, quick reference information, and supporting documents are available for download from the Novanta IMS download website <https://novantaims.com/downloads/>

Three-dimensional depictions of this product are available for download from <https://novantaims.com/downloads/3d-product-models/>



To select from the available features and build the LMD integrated stepper motor to fit your needs, use the Novanta IMS part number builder, available online at <https://novantaims.com/resources/part-number-builders/>

# MDrive Plus MLM•14 Step & Direction

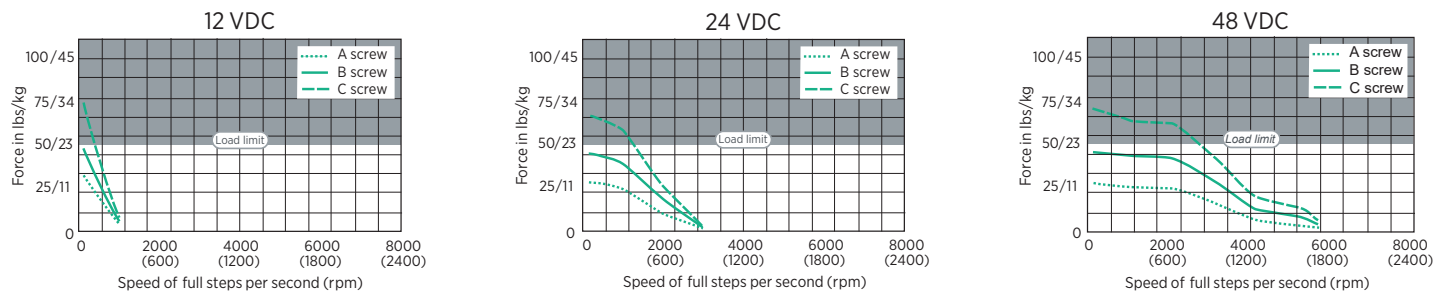
## Motor Performance

			MDrive 14	
Motor		Stack length	oz-in	Single
Holding torque		N-cm		13
Rotor inertia		oz-in-sec <sup>2</sup>		0.0003
		kg-cm <sup>2</sup>		0.021
Weight without screw		oz		8.0
		g		230.0
Maximum screw misalignment		"		±1
Maximum thrust <sup>1</sup>	Non-captive shaft	lbs		50
		kg		22
	External shaft with general purpose nut	lbs		25
		kg		11
Maximum repeatability	External shaft with anti-backlash nut	lbs		5
		kg		2
	General purpose	inch		0.005
		mm		0.127
Anti-backlash <sup>2</sup>	inch		0.0005	
	mm		0.0127	

<sup>1</sup> Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

<sup>2</sup> Only applicable for External shaft linear actuator with anti-backlash nut.

## Motor Speed Torque



Test conditions: maximum force/load is based on a static load. This will vary with a dynamic load.

Load limits:  
 non-captive shaft — 50lbs/22kg  
 external shaft — determined by selected nut

## Screws<sup>1</sup>

Screw lengths <sup>2</sup>	minimum	inches	3.0	
		mm	77.5	
	maximum	inches	18.0	
		mm	455.0	
Load Limits <sup>3</sup>	non-captive shaft	lbs	50	
		kg	22	
	external shaft w/ general purpose nut	lbs	25	
		kg	11	
End Options	threaded	metric	M4 x 0.7 mm thread to within 0.03" / 0.76 mm of	
		UNC	#8-32 UNC-2A thread to within 0.03" / 0.76 mm of	
	smooth	inches	Ø 0.1967 ±0.001	
		mm	Ø 5 ±0.003	
Lead/Pitch	screw A	Travel	Per Rev	Per Full Step
		inches	0.250	0.00125
		mm	6.350	0.0317
	screw B	inches	0.125	0.00063
		mm	3.175	0.0158
	screw C	inches	0.063	0.00031
		mm	1.588	0.0079

<sup>1</sup> Stainless steel rolled screws are corrosion resistant and non-magnetic, with Teflon coating available.

<sup>2</sup> Standard 0.1" / 2.5mm screw length increments are available.

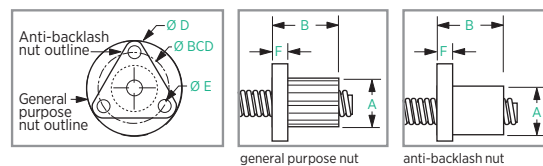
<sup>3</sup> Performance data for maximum force/load is based on a static load and will vary with a dynamic load

# MDrive Plus/Plus<sup>2</sup> MLM•14 Step & Direction

## Nuts<sup>1</sup>

			General Purpose Nuts	Anti-backlash Nuts
Dimensions	A	inches	0.50	0.50
		mm	12.7	12.7
	B	inches (max)	0.75	0.9
		mm (max)	19.1	22.86
	D	inches	1.0	1.0
		mm	25.4	25.4
	E	inches	0.14	0.14
		mm	3.6	3.6
F	inches	0.15	0.18	
	mm	3.81	4.57	
BCD	inches	0.75	0.75	
	mm	19.1	19.1	
Load limit	lbs	25	5	
	kg	11	2	
Drag torque		free wheeling	< 1.0 oz-in	< 0.7 N-cm

<sup>1</sup> External shaft MDrive Linear Actuators employ a nut which moves axially along the threaded shaft as the screw rotates. Two nut styles are available: general purpose and anti-backlash. While anti-backlash nuts provide higher accuracy and low drag torque, general purpose nuts are rated for higher load limits.



## Accessories

Description	Length feet (m)	Part Number
<b>Communication Converter</b> Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrivePlus via a PC's USB port.		
Mates to 12-pin locking wire crimp connector	12.0 (3.6)	MD-CC305-001
<b>Prototype Development Cables</b> Speed test/development with pre-wired mating connector with other cable end open.		
Mates to 12-pin locking wire crimp connector for I/O, communication, & power	10.0 (3.0)	PD12B-1434-FL3
<b>Encoder Cables</b> Pre-wired mating connector with other cable end open.		
For external single-end optical encoder with non-locking connector	1.0 (0.3)	ES-CABLE-2
For external differential optical encoder with locking connector	6.0 (1.8)	ED-CABLE-6
<b>Mating Connector Kit</b> Connectors for the assembly of cables. (Cable material not included). Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors		
12-pin locking wire crimp connector for I/O, communication, and power	—	CK-08
<b>Drive Protection Module</b> Limits surge current and voltage to a safe level when DC input power to the MDrive Plus is switched on and off		
For all MLM•14 step & direction input products	—	DPM75
<b>Quick Start Kit</b> For rapid design verification, all-inclusive QuickStart Kits includes prototype development cables and communication converter for MDrivePlus initial functional setup and system testing.		
For all MLM•14 step & direction input products, add a "K" to the beginning of the part number when ordering		